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observing long-period variables were considerable, as the observers had to determine the magnitudes of the comparison stars. These difficulties were removed in 1890 by the publication of charts and catalogues of comparison stars for variables by the Harvard College Observatory. Observations made before the 31st of December 1890 were corrected to the Harvard data, and since then the Harvard photometric magnitudes of the comparison stars have been used. Argelander's method of observing was adopted, and each observation of a variable was made by comparison with five stars of known magnitude in the same field. To the end of 1900 6,809 observations had been made and 267 maxima and 227 minima had been determined. Papers showing the light changes of ten variables have been published, and the whole of the observations made at the Rousdon Observatory, which are of great value, will appear in a volume of the *Memoirs* of the Society. Meteorological observations were also carried on, and weekly and monthly weather reports were issued from the Rousdon Observatory.

Sir Cuthbert Peek was elected a Fellow of the Society on the 11th of January 1884.

In 1884 he married the Hon. Augusta Louisa Broderick, eldest daughter of Viscount Middleton, and he leaves two sons and four daughters. He died on the 8th of July 1901.

Basil Woodd Smith was born in London on the 9th of March 1831. He was intended by his father for the Stock Exchange, but finding the work entirely uncongenial he soon abandoned it. Placed in circumstances which permitted him to give his time and counsel where they were needed, he was able to assist a number of good causes. He lived at Hampstead, and was chairman of the bench of magistrates. He assisted the local philanthropic institutions, and was for many years chairman of the Orphan Working Schools. He was a man of strong religious views, and was largely occupied in the work of the Bible Society, attending the committee meetings with great regularity for a long period. He also took great interest in Palestine exploration, and generally in all questions of Biblical archæology.

Although a good classical scholar, his interests were scientific rather than literary. He was for many years on the board of managers of the Royal Institution, and attended the lectures with great regularity. He frequently observed with a telescope he had erected on the roof of his house, and was always ready to show it to visitors and answer the questions they put to him. He was elected a Fellow of the Society on the 10th May 1861, and till recently was a regular attendant at the meetings.

Mr. Woodd Smith was twice married, and leaves eight children.

Henry Augustus Rowland, the son of the Rev. H. A. Rowland, D.D., was born at Honesdale, Pennsylvania, on the

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27th of November 1848. He studied engineering at the Rensselaer Polytechnic Institute at Troy, and received the degree of Civil Engineer (C.E.) in 1870. For a short time he was a railway engineer. In 1871–2 he was science teacher at Wooster College, and from 1872–5 was assistant professor at Troy. On the 3rd of April 1876 he was appointed Professor of Physics and Director of the Physical Laboratory of the Johns Hopkins University of Baltimore, and for twenty-five years added lustre to his university by his own brilliant researches and by the band of workers he stimulated to devote themselves to the progress of physical science.

Professor Rowland's first important paper was on magnetic permeability. This work he sent to Clerk Maxwell in 1873, who replied that he was sorry he could not communicate it to the Royal Society, as that Society was not in session, but that he had sent it to the *Philosophical Magazine*, and would himself, as Rowland was so far away, correct the proofs. Before taking up his professorial work he studied a little time in Berlin, and in 1876 made the important discovery that a moving charge of static electricity, like a current, sets up a magnetic field. He made an excellent determination of the mechanical equivalent of heat, but with this exception his researches alternated between electric and magnetic subjects and those spectroscopic researches for which astronomy is so greatly indebted to him.

Professor Rowland's spectroscopic work began in 1882, in which year he published a "Preliminary Notice of Results accomplished in the Manufacture and the Theory of Concave Gratings for Optical Purposes." It is well known how imperfect were the tables of wave lengths before Professor Rowland's time, and how his researches required him first to perfect the concave grating, and how this forced him to make his perfect screw and unrivalled dividing engine. His process of making screws is described in an article by him in the *Encyclopædia Britannica*, and an account of the ruling of concave gratings is given in *Phil. Mag.* for 1882.

After ten years' work with many gratings of 6 inches diameter and 21½ feet radius, in the course of which thousands of solar and metallic lines were measured by himself and his assistant, Mr. Jewell, Professor Rowland published in 1893 a table of standard wave lengths extending from λ 2000 to λ 7700, and containing about 1,000 lines. The publication of Rowland's "Preliminary Table of Solar Wave Lengths" was begun in January 1895 in the *Astrophysical Journal* and finished in 1897. It extends from λ 2975 to 7330, and contains about 20,000 lines, and is by far the fullest catalogue of the solar spectrum yet attempted. The strong lines are nearly all referred to the element producing them, and in connection with this work Professor Rowland had obtained photographs of the spectra of all the known elements except gallium, and at intervals the results derived from the measures of these spectra

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by him and his pupils appeared in the *Astrophysical Journal* as "Tables of the Arc Spectra of the Elements."

Professor Rowland's personal character is well described in the following extract from an eloquent address by Dr. Gilman, the President of the Johns Hopkins University: "Above his keen perceptions, his logic, his adaptation of means to ends, and his marvellous concentration I must place his love of truth. He was true in all his investigations, careful to eliminate errors, to avoid misconceptions, to shrink from hasty conclusions and inferences, to be critical of other investigations, to be accurate, exact, conscienticus, to spare no pains, to shrink from no efforts, to conceal no difficulties, in order that the absolute facts might be established, as far as this can be done, by limited humanity. To him science was another word for truth—not all the truth, but that amount of truth which the limited powers of man have discovered. He was a follower of Isaac Newton, picking up from the seashore a few pebbles and discerning their lessons."

Professor Rowland was a member of many learned societies in Europe and America. He was elected an Associate of the Royal Astronomical Society on the 9th of December 1898. He died at his home in Baltimore on the 16th of April 1901. His body was cremated and the ashes buried beneath his famous ruling engine.

Truman Henry Safford was born on the 6th of January 1836, at Royalton, Vermont. In extreme youth he possessed extraordinary powers of arithmetical calculation, of which an account is given in *Chambers's Edinburgh Journal* for October 1847. These powers were not in his case intuitive, but were improved by study and practice, and at a very early age he obtained a knowledge of algebra and geometry. His father wisely decided to give him a good education, and at the age of ten he was placed under the charge of Professor Everett and Professor Peirce at Harvard College. In 1854 he graduated at Harvard, and immediately obtained employment at the Observatory. He remained at Harvard College Observatory for twelve years, and during this time published a number of Elements and Ephemerides of Comets and Minor Planets in the *Astronomical Journal*, and contributed several papers to the *Monthly Notices*. The most interesting of the latter is a determination of the orbital motion of *Sirius* from the observations of declination. In 1860 he prepared a Catalogue of the Declination of 532 Stars culminating near the Zenith of the Harvard College Observatory, for use in the survey of the Great Lakes in the determination of latitude by Talcott's method. In 1865, after the death of Professor Bond, Professor Safford was for a short time in charge of the Observatory. During this time he brought out vol. iv. of the Annals, consisting of a Catalogue of Standard Right Ascensions of Clock Stars and Close Polars. He also edited